Rural Lines

MAY
1956

NEW HORIZONS

FOR RURAL ELECTRIFICATION

Next Month—Roundup on the Telephone Program

RURAL ELECTRIFICATION ADMINISTRATION • U. S. DEPARTMENT OF AGRICULTURE

A Message from the ADMINISTRATOR

LOAN security and balance sheets are familiar terms in rural electrification. Most discussions about financial matters such as these are concerned with money, assets, earning possibilities, and operating margins. That is because we need to reduce material things to a common denominator. In business of any kind this is usually money.

The old saying is that "money isn't everything." This is particularly true in the rural electrification program as it faces the future. The more I learn about the real deep-down strength of our rural electrification systems, the more convinced I become that the dollar sign is not the only yardstick for measuring our own past performance and future potential.

It is shortsighted, I believe, to overlook the greatest resource of any business enterprise—the people themselves, the members who have a stake in its success. Human beings have always had an ability to absorb adversity, to adapt themselves to changing conditions.

That is why I am an incurable optimist about the future of rural electrification. Perhaps I get a little impatient at times with those who see doom around the next corner and who are ready to forsake principle to seek a temporary advantage. I have great confidence in the ability of our co-op people—the managers, the directors, and the members. The 20-year history of REA rural electrification is full of examples where these people have proved sound, durable and resilient.

We need to watch the dollar totals, but remember that, so long as we have human resources working with us and for us, our rural electric business is bound to have a bright future.

Aubrey Wilson

Administrator.

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'56 INTRODUCTION '76

OUR world, our country and our agriculture have been subject to such a vast technological, economic and social change within the past three decades as to have the effect of compressing the progress of three centuries into 30 years.

The end is not yet.

Perhaps we have but barely made a beginning. With so much momentum gained, there is good reason to expect that science and technology may project even more dramatic phenomena in the 20 years ahead.

Ours is a world in transition. A world where revolutionary rather than evolutionary concepts tend to stimulate events. To some, this is a world illuminated with hope and challenge. To others, it holds undefined hazards and shadowy fears.

The danger, of course, is for those organizations or individuals, unable or unwilling to adjust to things to come. Or who are unable to identify change when it is going on about them.

Often we can modify the otherwise shattering impact of change if we recognize its source and the direction it is taking.

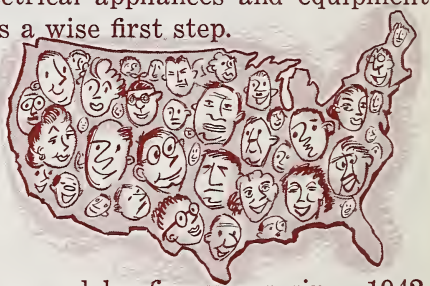
Awareness that change is taking place followed by honest esti-

mates of its possible effect is about as close as we can come to a realistic vision of the future.

It is within this framework, that we have collected facts and figures and have indicated possible trends and potential pitfalls for the purpose of stimulating thinking about the future of rural electrification.

'56 FACTS FOR THE FUTURE '76

YOUR business grows upon its resources. Aside from technological advances and the quality of management, resources which determine success or failure of a rural electric system are people —their numbers, their incomes and sources of income, their living habits, and their acceptance of electrical appliances and equipment. A look at the facts in your future is a wise first step.



● National population — now at 165 million — is expected to pass 200 million before 1975. Population is growing at the rate of 2 million a year.

● Average life expectancy has increased by five years since 1942; science and leisure promise even longer life to millions.

● In the past decade, 37 million babies were born. By 1965 many will be of college age. By 1970 they will be forming new family units and creating new consumer demands.

● The number of farm residents now amounts to 13.5 percent of the total population. About 22 million people are living on farms, a drop of 3 million since 1950.

● Between 1950 and 1954, the number of farms decreased from 5,382,162 to 4,782,393, a drop of nearly 600,000. In that same period, REA borrowers connected about 900,000 new rural consumers.

● Although REA borrowers serve no more than 60 percent of our 4,782,393 farms, these systems serve 4,187,825 rural consumers.

● The average size of farms has increased from 215 acres in 1950 to 242 acres today. Farms of over 100 acres have doubled in number since 1925. And the number of farms under 100 acres declined by 449,000 between 1950 and 1954.

● It is estimated by *Chemurgic Digest* that city and industrial expansion uses up about 1 million acres of farm land each year. In 1954, there were 1,158,233,190 acres of farmland.

● In 1940, a farm worker produced enough food, fiber and tobacco for himself and 10 others. Now he provides for himself and 18 more.

● In 1955, there were 3 million farm men and women supplementing their income by wages from non-farm jobs. This is three times as many as in 1930.

● At the end of 1955, the electric industry was serving 52.6 million customers including the 4,187,825 served by REA borrowers.

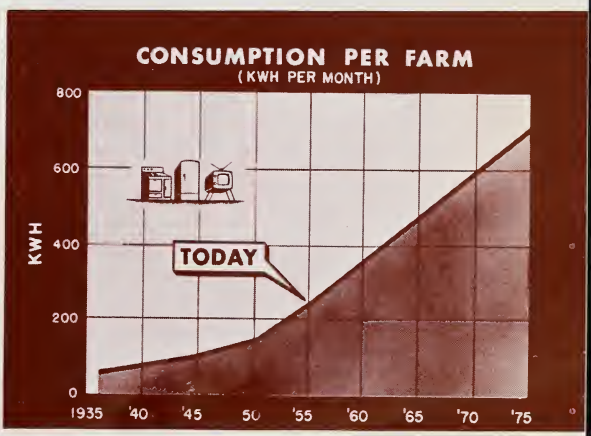
● As automation comes to factory and farm, productivity is expected to increase while the work week decreases.

● As pension plans and social security cover most of the population, retirement age will lower.

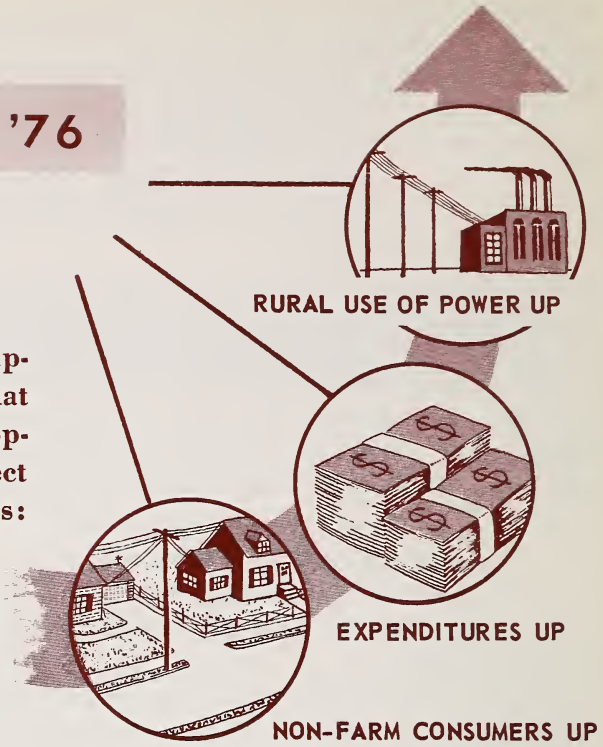
● Residential use of power in urban areas, averaging around 3,000 kwh a year in 1955, is expected to grow to around 8,000 kwh by 1970.

● The electric companies, now making capital expenditures at the rate of almost $3 billion a year, expect the amount to double by 1970.

● Over a period of time, the electric industry as a whole had doubled in size each 10 years.



'56 OUTLOOK '76



A broad program appraisal indicates that three major developments are in prospect for the next 20 years:

1 **Rural use of power will increase to three times its present level, matching increase which has occurred since 1936;**

2 **Borrowers are expected to double the amount of capital expenditures made in the first twenty years, and**

3 **It is likely that the number of farms will decrease, but there will be more non-farm consumers in rural areas.**

How these developments will affect your particular rural electric system is pretty much for local management to determine.

Broad program predictions are largely based on averages and an average is a blending of highs and lows. For an average to have much value, it needs to be looked at as a guide and not as a goal.

While it is true that an average may be useful in detecting a trend, it should also be kept in mind that change is many-gaited. Take any preselected group of factors affecting a rural electric system and you are likely to find that the speed of change of any given unit has its own level.

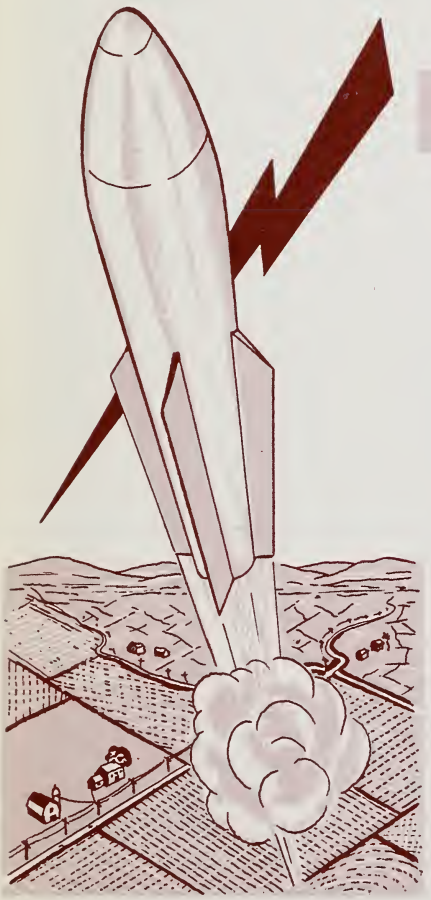
Any peek into the future, bounded by the area of Gander Ridge on the north and Wildcat Creek on the south, requires a starting point. You must make some assumptions. But suppose you make assumptions without

testing them for their validity. Do you have a picture of the future or do you have a mirage?

Maybe that is why prophecy when it has to do with your own business is always likely to err on the conservative side. And perhaps that is why the ones who predict who have no responsibility for the success of the business are able to exercise more free-soaring imagination.

It is a natural temptation to take the easy approach, that just about everything in existence can be made obsolete overnight. Sure, in theory, that's possible. But tempering enthusiasm with realism takes you on another road.

There's a lot of time to be expended between the idea, the drawing board, the pilot model, testing, modification, full-scale manufacture and distribution. The timelag tends to lessen with each passing year but as ideas become more advanced and machines more complex, the less chance you'll have of compressing time to your whim.



'56 POWER USE '76

RURAL systems are expected to use three times as much power in 1976 as today.

In 1936, rural electrification meant "lights," radio and a little refrigeration. After 20 years, there are still systems where refrigeration is the principal load. You'll hear it said that in 1956, close to 80 percent of rural electricity is still being used in the house and only 20 percent for productive farmyard tasks. If these ratios were to be completely reversed in the next 20 years, the lines on your sales chart would zoom like a jet-powered rocket.

As of now your average farmer-member thinks of electricity

more in terms of comfort and convenience than in terms of productive capacity. But mounting labor costs alone may have much to do in shifting the emphasis. To make a profit, the farmer is constantly on the lookout for ways to produce more efficiently.

As the cost of labor increases, farmers are more likely to install and use new and improved electrical equipment.

From the long range view, farm fuel may play a part. Developments in the petrochemical industry are moving at a fast pace. Suppose the day should come when so-called byproducts of petroleum will have a higher claim on available supplies than its use for fuel. If that happens your farmer-members, when they are looking for additional sources of energy, may turn to electricity to do many new tasks.

But operating farm field machinery by electricity is not new, you'll say. It has been done on a small scale in some European countries. One basic tenet of the utility industry is that availability of power stimulates new uses. Certainly this has happened in rural electrification, and will continue to happen.

Designing and installing a farm distribution system with electricity in every field might open the way to many interesting findings. Insect control by means of light traps or high frequency methods are practical possibilities with electricity available in the field. It could, for example, inspire someone to engineer a new family of farm implements operated solely by central station electricity. Or each field might have its own irrigation well, electric pump

and permanent water distribution system.

These are hypothetical illustrations which have to pass the test of research, but something of this nature must eventually develop, if each farm is to make full use of electricity.

Another trend which affects the amount of power you'll sell is indicated in population shifts. The number of farms, around 4.7 million with a population of 22 million, does not begin to define the total population whose interests are rather closely linked to what happens on the farm.

Some 36 million Americans are now living in towns with a population of 2,500 and under. Even making exceptions for towns which are of the commuter or industrial type, there is still a great mass of people whose economic and social interests are conditioned by what happens out on RFD 1.

If your rural areas become bedrooms for cities and towns, service businesses, schools and churches will follow population. For the future, a growing part of your rural load may be exclusively residential in nature.

Then, too, the daily battle of getting work tends to force some dispersal of both people and industry. There are, it appears, two streams of population flow: One leaving the farm and the other settling in rural areas. The situation, of course, varies widely in different sections of the country.

In time your system may have a situation like that of the Jefferson County Electric Membership Corporation with headquarters at Louisville, Ga. Manager James B. Polhill, Jr., has this comment about their problem:

"As time passes there will be more and more uses for electricity and increasing usage of appliances now being used only moderately. This explains why our power purchases and revenues go higher each month although we continue to lose consumers.

"If all the houses we have connected since the co-op was started were now being lived in and using electricity, we would have 1,800 more consumers. If the 1,800 lost members paid an average bill, we would be collecting an additional $10,500 a month.

"The agricultural revolution going on in our area has an effect on the co-op, but fortunately loads continue to grow, revenues continue to climb and our financial position grows stronger and stronger."

"As the cost of labor increases, farmers are more likely to install and use new and improved electrical equipment."

Courtesy, Ohio Brass Company

'56 SYSTEM PLANNING '76

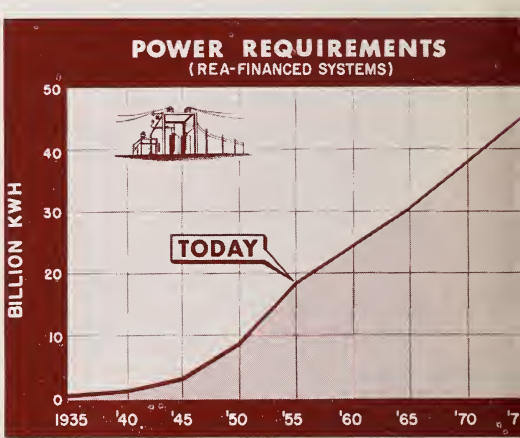
With the average load three times greater in 1976 and with new situations being created by population shifts, planning the physical rural electric system to meet the need takes on a note of urgency.

A system can't be built to serve an average. The design must provide for the peak load on each circuit or individual area of the system. And on a rural system the 6 p.m. peak on a December night makes you think the chart maker has gone crazy.

SOUND system planning requires that you keep a constant watch over the nature and location of the load. In the coming years, your plans will need to be more flexible, with accent on review and modification rather than following a rigid plan in which years rather than conditions determine your thinking.

Realistic planning is the only assurance that your system will have reserve when and where it is needed.

You may have to do some thinking as to whether your present type of system will be adequate to serve 1976 loads. By that time, changes in the nature and character of farm electrical equipment may make outages intolerable for your farmer-members.



Put it this way, the farmer of the future may be so dependent on electricity for production that he just can not afford more than the most momentary interruption.

On the bright side, technology may help you cope with the challenges. An improved automatic outage locator should not be too

far away. A great deal of work has been done in that field and better understanding of the techniques of electronics should bring solutions to an old problem.

More effective 2-way radio systems and improved highways have already contributed a great deal to cutting down outage time. You'll recall that modern communication systems were rare among rural electric borrowers not too long ago. Now it is a rare system that does not have one.

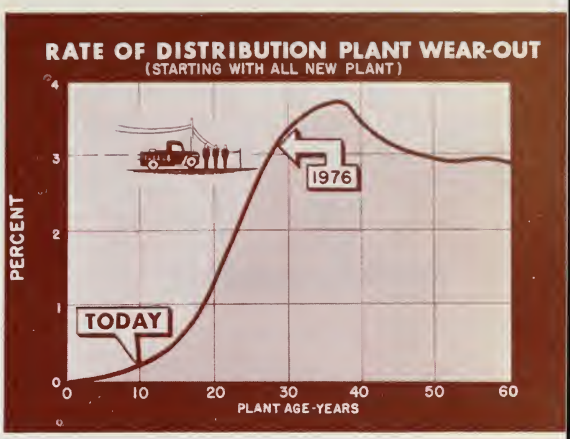
Along the same line, you will want to keep close watch on developments in what is called the "package" nuclear reactor field. The year 1976 could possibly find that you may be using them to replace substations. In fact this, more than any other development now visible on the nuclear power horizon, seems to hold greater promise for your rural systems.

The average age of distribution plants of REA borrowers is about 9 years. Like most systems, yours is probably still new enough to require only a small amount of expenditure for replacement. Overall, the failure rate of equipment and materials is running at less than one-fifth of one percent. Yet you must remember that, as distribution plants age, the failure rate rises.

By 1976 today's 9-year-old plant can be expected to have a failure rate 15 times the present figure. That's based on average utility experience records.

Capital expenditures at the present time are mainly for system improvements and power supply facilities. Average plant value for distribution borrowers is now around $2.5 billion.

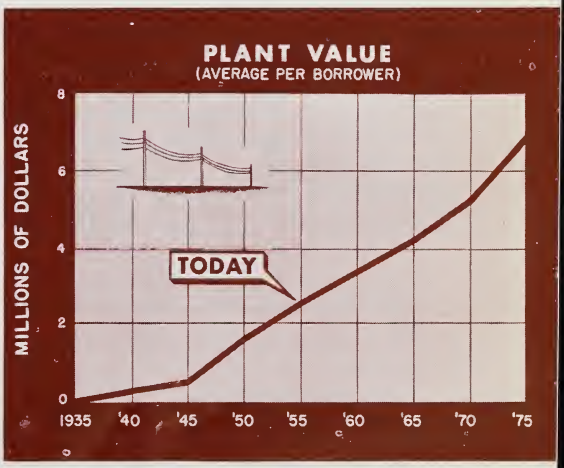
Industry experience indicates



that annual addition runs between 8 and 12 percent for system improvements and new connections.

Since borrower plants are newer and the number of connections is not so great as before, let's assume that 5 percent would be a logical figure. Even at this rate, the value of distribution plant figures to be 3 times its present dollar sign in 1976.

The estimate: $5 billion needed for distribution borrowers during the next 20 years.



'56 POWER '76

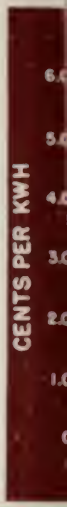
WHERE to get the power to supply 1976's estimated annual requirements of 45 billion kwh calls for long range planning. It is a challenge that will face management for some time.

Nuclear reactors will certainly be in that future picture but probably not as the miracle answer some would like to believe.

Atomic experts figure it may be 10 years, maybe more, before nuclear plants will be competitive with conventional generating systems. Fissionable materials may well reach the point where they are competitive with coal or oil. The fact remains that answers still have to be found for many troublesome questions. How do you get around the fact, for example, that the reactor itself is much more costly than a conventional plant? Or how do you meet the insurance problem?

As engineers gain experience in nuclear technology, reactor generating plants will increase in number and efficiency. By 1976, it is estimated that one-fourth of the total installed generating capacity of the industry will be nuclear plants.

Wholesale power costs have been cut in half in the first 20 years of the program. But that's no reason for expecting this trend to continue. Fact is, it is more likely to go the other way.



Materials, supplies, labor, taxes and money—all the things which go into the generation of power—have increased in cost. This has tended to offset the gains from more efficient generation techniques and better load factor. And the high initial investment required for nuclear plants outweighs the possibility that A-power will bring about lower wholesale cost by 1976.

Because of the national need for power, always going higher, you

can expect the industry to make massive investment in generating plants. The trend, now and for the future, is for the construction of plants of greater size than anyone had anticipated a few years back.

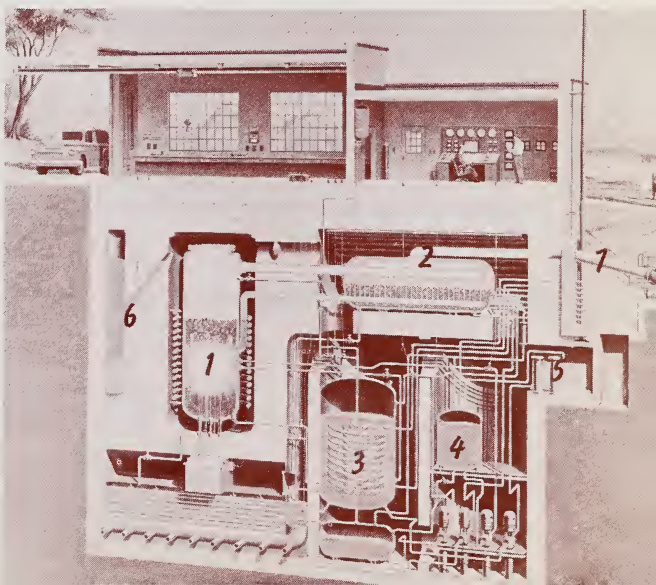
You can expect greater utilization of balanced loads and interconnections with surrounding power suppliers, as well as the plant techniques which mean economy of operation. These include the fuel burning devices, automation, electronic controls, and, in many instances, closed circuit television to permit engineers to watch gauges and instruments in remote areas.

There's a fancy price tag on generating plants of this size and nature. They must have a big load to justify their existence. To what extent generating plants handling only a sharply peaked rural load will be able to justify huge investments for expansion is a problem yet to be solved.

Yet expansion there must be if farm power needs are to be met.

If you depend upon hydro, you have another problem: The natural limitations on the amount of firm power from your hydro electric sources. Borrowers in hydro areas are seeing the power soaked up by demand just as fast as it comes on the line. If dry summers have troubled your area, then you've had a preview of what may be commonplace in the future. Supplemental steam generation in hydro areas seems to be called for in considerable volume.

The 20 year estimate: Power suppliers in borrower areas will spend about $2 billion and REA borrowers $1 billion for generation and transmission.



Rural electric systems may receive power in the future from nuclear power plants similar to this boiling water heterogeneous reactor proposed by the Rural Cooperative Power Association, Elk River, Minn., for participation in the AEC reactor program. Main elements shown here are: (1) Reactor core; (2) heat exchanger; (3) blow down quench tank; (4) demineralized feed water tank; (5) demineralizers; (6) storage for spent fuel rods. Steam is fed to the turbo-generator (not shown) through pipe (7).

IN SUMMARY, what do all these related and unrelated figures, speculations, assumptions, forecasts and trends mean to you—as a member of the board or manager of a rural electric system?

Well, in general, they are meaningful only to the extent that you find and relate the same factors—some in reduced scale—within the borders of your own system area.

You can't afford to overlook the possibility that the development of new techniques can radically change the way you live and do business.

There's always the example of the man who has exclusive sales right for a product for the whole country and still can't make a go of it. He's selling buggy whips.

Let's take a closer look at some of the things which will be affecting your system. This matter of more non-farmers in rural areas would seem to raise a public relations problem. If their interests are directed solely to city and town it does not seem likely that they will have much understanding of or sympathy with rural electric cooperatives. Many borrowers have experienced this problem to a degree with the influx of temporary users in vacation area.

In the next 20 years it is likely that a great percentage of members now on your lines will be retiring from farming. They will be replaced by a new generation who, for the most part, will have had little opportunity to acquaint themselves with the atmosphere of zeal and enthusiasm which went into the founding of the system.

The prospect for management is much the same. The pioneers of rural electrification, board members and manager alike, will be at or near retirement age.

You will need to consider (1) the development of training courses for new directors, (2) how to use younger members, possibly on a junior board, and (3) a review of policies dealing with replacements.

This also raises some questions about continuity of management and the advisability of staggered terms for board members. There otherwise might be an occasion when virtually all board members came to retirement age at about the same time.

If you anticipate the use of a nuclear reactor, you'll be faced with special questions. Highly trained manpower will be required for such installations. Their salaries, while their skills

are yet relatively rare, are likely to be in the upper brackets.

Office devices involving electronics and automation are still in the "big" stage, suitable primarily for big operations. Eventually they will be built and priced to fit offices the size of yours.

You'll welcome these developments to reduce some of the drudgery which goes into billing and statistical work. These may help you in analyzing and planning system improvements and expansion more accurately and economically.

As you face the prospect of investing your share of the $6 billion of new capital for rural electrification in the next 20 years, you are rightly concerned with money supply as well as power supply.

As consumers use more power, you must be ready with system improvements. System improvements cost money. The need for more power creates the need for more money.

It does not appear that there can ever be an end to the growth of rural electrification. The misleading concept that rural electrification is a 35-year deal goes right out the window.

Money to meet future needs may come from several sources. You may be one of those who have already pioneered in self-financing. Or you may be building your financial strength, striving to increase members' equity as fast as this can be done consistent with other needs and goals. Certainly you will be in a stronger position if your members own a growing proportion of your own plant.

Even if yours is a newer cooperative with low density or usage, you will have such resources as the overall success of the rural electrification program and the manifest interest of Government in getting and maintaining reliable service to all farmers who need it.

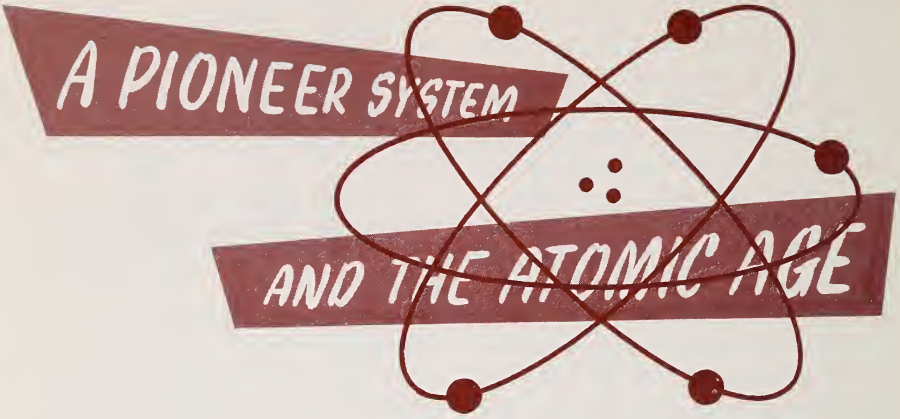
It is when management is fully aware that the decisions made today may have effects that show up 10, 20 or 50 years from now that you have management thinking in all its dimensions.

As you look to the future, you might find it advantageous to condition yourself to change and you can do it by making creative rather than routine decisions.

Non-creative decisions are the ones which are forced on you by events. It becomes a routine reaction to forces in which you had no hand to shape, guide or control. Some men make better routine decisions than others, but the level of accomplishment is that of putting oil on the squeaking wheel.

Creative decisions, in contrast, require an identification of the nature of change, and the development of a plan to guide and modify change so that it works in the best interest of your business.

There you have the challenge to management that the next 20 years offer. You can go either direction.



Aiken Electric Cooperative Had the Resources To Cope with the Big Challenge When It Came

ARE YOU prepared to have an atomic bomb make its home in your service area?

That's what happened to the Aiken Electric Cooperative of South Carolina. In the last five years Aiken Electric has been experiencing dramatic, far-reaching changes that come when an atomic energy plant locates in its area.

On the one hand it lost a part of its service area. On the other it was swamped with new consumers wanting service, but now!

This kind of change isn't in the cards for every co-op, obviously. But the case illustrates some aspects of what your co-op might be up against, if the shift in population that is now going on, should one day concentrate in your area.

The atomic future came to Aiken late in 1950. An announcement by the Atomic Energy Commission said that plans for the Savannah River Project had been approved.

But for Aiken there was nothing prosaic about it. First of all, the size: A plant worth $1.5 billion was to be built and operated in the area. Specifically, this was to mean:

- **An influx of 39,000 construction workers, plus their families.**
- **Displacement of 1,500 local families.**
- **Provision for 10,000 permanent employees or about 30,000 residents.**

Fortunately, Aiken Electric Cooperative had what it took to make the adjustment to the dramatic changes. For example, the co-op had long experience in the power business. It had seasoned management and a disposition to plan for the future.

This closes a series on the first 3 borrowers to obtain REA loans. Earlier articles about the Boone County Rural Electric Membership Corp., Lebanon, Ind., and Volunteer Electric Cooperative, Decatur, Tenn. appeared in the June and July 1955 issues of RURAL LINES.

Aiken Electric was one of the first three borrowers to obtain an REA loan back in 1935 and several of the people who helped get the cooperative organized and into operation are on the job today.

Three of the original directors are still serving on the board.

Vice President Ashton Head is one of these and, as he contemplates the problems brought on by the Savannah River Project, he recalls what they were able to do in the face of adversity in those early days.

Manager W. H. Schreiner

For one thing, they were short of money. Before the first loan allocation came through, Mr. Head borrowed $1,500 on his personal note to keep the project alive.

Another pioneer, C. J. Asbill, was the first treasurer of the Aiken Electric Cooperative. Seeing today's job of keeping up with a tremendous influx of new consumers, he remembers the time when the co-op business letters had to be typed without charge by the secretary to the county agent.

"We had 366 consumers with an average consumption of 35 kwh," Mr. Asbill recollects. "That's some contrast to our present members of more than 10,000 and average annual use close to 250 kwh."

The third board member who has been around since the start is R. M. Furtick. In the organization days he had the job of signing up farmers and getting them to pay their membership fees.

Comparing the early signup to the current pressure for service,

These directors have served their pioneer South Carolina cooperative continuously since 1935. They are (from left) Ashton Head, Aiken, vice-president, C. J. Asbill, Wagener, and R. M. Furtick, Springfield.

Mr. Furtick says, "It was discouraging work at first because many could not believe that a group of farmers could organize such a project or know how to run it successfully after it was organized. But thanks to competent employees and REA guidance in the early days, we made out."

This pioneer director compared the difference between today's co-op and that of 20 years ago and cited the recent annual meeting to which 9,000 people came.

"It was a real thrill," says Mr. Furtick, "to look out into that sea of faces and think back to the early days. I felt a great satisfaction in having played some part in helping to get the blessing of electricity to so many rural people."

With directors such as these at the helm, the Aiken Electric Cooperative sailed along smoothly up to the day the impact of the atomic age hit almost without warning. Then, it became a matter of adjusting fast enough to cope with the new problems.

Looking back on those days of change and confusion, Manager W. H. Schreiner sighs deeply and wonders how everyone survived.

"In the early stages," he says, "There were times when the lines burned a cherry red in the darkness of the night. We just did not have enough system at the beginning to meet this new and sudden demand."

Thomas H. Craig, line superintendent.

In the course of heavying up and relocating lines and substations this is what happened between 1950 and 1955:

- **Consumers increased in number from 6,739 to 10,177.**
- **Kwh sold in a year increased from 8,839,968 to 29,806,064.**
- **Average kwh per consumer increased 2½ times.**
- **Percentage of minimum bills decreased by 10 percent.**

These figures represent a lot of work in planning, financing and construction.

The cost of rebuilding the system to handle the changed situation amounted to $1½ million in loan funds.

Actually, about 700 miles of new line had to be added to the system. Beyond this, the rest of the job came under the heading of system improvements.

A man who played a big part in seeing this job carried forward expeditiously is Thomas H. Craig, line superintendent, who was the co-op's very first employee. With the exception of time in the Army, he has been on the job ever since.

Mr. Craig started as a rodman but he says his work included everything. The co-op then had a one-room office, one truck and paid mileage on only one car. Handling today's job, the co-op has a modern office building, 20 cars and trucks and 60 employees.

The changes that Aiken Electric has had to meet in a relatively short time likely are greater than those the average cooperative will be up against. But only a look into the future will show that there will be changes for every co-op and these will be as intriguing as any since 1935.

Reserve merchant ships riding at anchor in Tensaw River.

Alabama's Gulf Coast Booms

The 'Big Change' Strikes Down Mobile Way – And Rural Power Demand Increases 7 Times in 10 Years

HOW DO you face up to the 'big change' when it strikes your area? Pretend to ignore it? Or do you hustle to get the jump on it?

Not far out of Mobile, Ala., the Baldwin County Electric Membership Corporation provides an example of how to serve an area that's been growing by leaps and bounds since the end of World War II.

Manager A. M. Redd saw what was coming, geared his organization to meet the challenge and predicted there would be more progress than most people expected.

So far his forecast has held up. So well, in fact, that the co-op's No. 1 problem is not how to promote load building, but how to keep up with the ever-increasing number of new consumers. And it isn't neglecting load-building either.

Even when your system is alert to changing times, it comes as a little shock when a new consumer like the U. S. Maritime Commission asks you for 1 million kwh a year to help preserve 350 merchant ships of the Reserve Fleet.

Cathodic treatment powered by electricity keeps the submerged portion of the ship from corroding.

Serving a fleet is not a likely load for a rural electric system. Because the co-op had extended its lines to meet rural needs, it happened to be the only power supplier in a position to meet the request for service.

The Baldwin system hooks up new consumers at the rate of around 300 a year. Heavying-up, new substations, and rephasing of lines goes right along with numerical increase. Membership has passed the 5,000 mark. Light industry, motels and small business

Electric power from Baldwin County EMC keeps merchant ships fit for defense service. This crane barge is one of several types of maintenance craft employed.

establishments make up a lot of the growth.

And the pattern of the future is indicated by the fact that the co-op has more than 1,000 air-conditioning units on the line.

Looking at the big picture of what is going on, Manager Redd has this to say: "Something was bound to happen here. We have wonderful farming land, a delightful climate and the tremendous attraction of the gulf coast and many beautiful rivers. How it has lain dormant so long is what is amazing, but now that growth has begun we are all but out of breath trying to stay ahead of the increased use of electricity."

As farming becomes industrialized, he points out, the farm picture changes too. There are very few small dairies left because electric milking machines, bulk handling and bulk cooling of milk multiply one man's capacity manyfold. All this means larger transformers, heavier wires and constant effort to prevent outages.

"Electricity in the kitchen has supplanted the hired cook at considerably less cost," Manager Redd reports. "This affects us too. With hundreds of ranges in use at the same time, you can see how important it is not to have an outage at that hour.

"And what electricity has done to the country store! Meat, vegetables, soft drinks and desserts are all cooled by electricity. The stores find them necessary to meet competition. Imagine how an outage affects them and us!

"We used to get calls to restore 'lights.' Now the cry is to restore 'power' for the milker, the freezer cabinet and the veneer machine.

"All these things have changed our thinking. We are compelled to use larger transformers even on new services. We have had to increase the size of service conductors extended to houses and you will see larger transformer banks at the substation.

"They say power sales in general double each 10 years. Well, in our two counties, Baldwin and Monroe, energy sales have increased 7-fold in the past 10 years!

"All we can see in the future is more power, power, power!"

$1 Billion Outlay

'Heavying-Up,' G-T Expansion Will Play Biggest Part in Future Building

EARLY signs of the changes expected to develop in borrowers' new capital expenditures within the next 20 years (see page 10) appear in REA's latest 5-year survey of construction plans.

In the fiscal years 1957 through 1961, borrowers will add nearly $1 billion in new and improved electric power facilities to serve rural consumers, REA estimates. The survey shows that at this time borrowers are planning construction for the next five years that will cost $805 million. Past experience indicates that actual construction will run about 20 percent above borrowers' advance estimates or $1 billion for the period. This would match construction expenditures during the 1952-1956 fiscal years.

To cope with growing rural power loads, borrowers expect to invest more than half (58.5 percent) of the new capital in generation and transmission facilities and system improvements. These have accounted for only 41 percent of the dollar total of all electrification loans made by REA to date.

The new estimates are based on returns from 78 percent of REA's electrification borrowers and information for 1956-60 received last year from 94 other borrowers. The basic survey data were expanded to provide estimates on the 984 active distribution and power-type borrowers.

Other findings of the survey include the following:

1. Borrowers will submit to REA new loan applications for $617 million over the five-year period. REA estimates that applications actually submitted during the period might reach $800 million.

2. In the 1957 fiscal year, beginning July 1, 1956, the borrowers plan to invest $193 million in new construction while submitting new loan applications for $141 million.

REA's electric loan program now is at its highest level since 1951. Loans of more than $180 million are anticipated for the current fiscal year and for the fiscal year beginning July 1.

The accompanying tables contain additional details.

Table 1—Total Construction Planned and Loan Applications to be Submitted for Planned Construction, Fiscal Years 1957-1961.

	1957	1958	1959	1960	1961
	---- in millions of dollars ----				
Total Construction Planned[1]	$193	$185	$142	$135	$150
Type of construction:					
Distribution and other[2]	83	71	61	61	58
System Improvements	57	50	46	45	45
Generation	34	46	26	16	35
Transmission	19	18	9	13	12
Loan Applications, Total[3]	$141	$132	$129	$111	$104

Source: 1955 Survey of REA Borrowers' Construction Plans and Financial Requirements. Data adjusted to provide 100 percent coverage.

1 Does not include anticipated requests for reimbursements of general funds or loan requirements for consumer facilities.

2 This is principally new distribution line, but includes substation switching not a part of system improvements, headquarters facilities and miscellaneous items not specified in other categories.

3 These data represent applications to cover construction through 1961. The total applications to be submitted in 1959, 1960 and 1961 may be expected to exceed these figures, since a part of the loan funds applied for in those years will be used for construction subsequent to 1961.

Table 2—Construction Planned by Distribution Type Borrowers, by States, Fiscal Years 1957-1961[1] [2]

State	1957 (Thous.)	1958 (Thous.)	1959 (Thous.)	1960 (Thous.)	1961 (Thous.)
United States	$151,975	$138,455	$109,243	$107,514	$107,000
Alabama	3,206	2,460	2,379	2,499	2,676
Arizona	1,315	1,609	1,078	1,312	1,673
Arkansas	4,956	4,069	3,525	3,501	3,311
California	2,657	2,274	2,511	2,671	2,863
Colorado	4,216	6,720	3,353	2,685	2,322
Delaware	307	142	218	218	—
Florida	2,891	2,651	3,349	2,777	2,518
Georgia	5,776	4,872	4,575	4,659	4,820
Idaho	572	508	604	546	530
Illinois	4,137	3,389	3,393	2,908	3,438
Indiana	3,620	2,611	2,513	2,368	2,584
Iowa	2,971	2,450	2,200	1,848	1,680
Kansas	4,389	3,157	3,292	2,237	1,930
Kentucky	5,284	5,472	4,908	5,163	4,792
Louisiana	2,255	2,055	2,317	2,100	2,063
Maine	1,312	138	161	33	33
Maryland	1,535	1,341	896	926	601
Massachusetts	—	—	—	—	—
Michigan	3,360	2,052	1,508	2,869	1,228
Minnesota	5,128	4,920	4,036	3,865	3,412
Mississippi	6,261	5,558	5,748	5,294	5,554
Missouri	5,324	4,809	4,380	4,657	4,648
Montana	1,780	1,419	1,747	1,463	786
Nebraska	4,910	4,338	3,422	3,150	3,008
Nevada	—	—	—	—	—
New Hampshire	426	390	318	282	232
New Jersey	306	114	68	97	67
New Mexico	1,807	7,918	1,634	2,289	6,502
New York	155	130	141	125	107
North Carolina	6,095	4,743	4,909	5,238	5,400
North Dakota	2,272	2,282	2,341	2,070	1,594
Ohio	3,487	4,493	3,272	3,051	3,098
Oklahoma	5,045	4,394	3,637	3,436	3,387
Oregon	1,593	1,408	1,342	1,084	957
Pennsylvania	2,404	2,271	2,421	2,135	2,140
South Carolina	2,587	2,558	2,294	2,318	2,200
South Dakota	2,591	2,049	1,708	1,633	1,348
Tennessee	6,607	5,951	5,770	5,611	5,245
Texas	20,255	19,440	7,509	7,659	10,476
Utah	—	—	—	—	—
Vermont	3,423	113	92	125	94
Virginia	3,082	2,562	2,830	2,881	2,188
Washington	2,916	2,855	2,213	2,993	2,190
West Virginia	15	7	16	10	13
Wisconsin	1,736	1,465	1,375	1,399	1,192
Wyoming	3,533	1,495	1,545	1,701	922
Alaska	3,478	2,803	1,695	1,628	1,178

[1] The apparent decline in construction from 1957 to 1961 may reflect inability of the borrowers to forecast accurately all of their requirements for future years rather than an actual decrease in construction.

[2] Does not include scheduled reimbursements of general funds or loan requirements for consumer facilities.

[3] Construction expenditures were not reported for Nevada and Utah. At December 31, 1955, distribution borrowers in Nevada had a total of $26,279 in unadvanced loan funds and those in Utah had $2,961,555 unadvanced.

Table 3—Loan Applications to be Submitted by Distribution Type Borrowers to Cover Planned Construction, by States, Fiscal Years 1957-1961.[1]

	1957 (Thous.)	1958 (Thous.)	1959 (Thous.)	1960 (Thous.)	1961 (Thous.)
United States	$120,254	$107,748	$87,486	$84,195	$56,858
Alabama	3.246	1,763	1,390	1,513	1,588
Arizona	1,620	1,420	519	1,104	1,651
Arkansas	6,592	3,814	3,239	3,851	2,340
California	4,658	129	5,422	110	6,220
Colorado	2,226	4,364	2,636	1,071	1,152
Connecticut	—	—	—	—	—
Delaware	373	—	371	—	—
Florida	2,605	3,889	2,215	2,288	1,416
Georgia	4,622	3,655	5,316	3,978	4,314
Idaho	367	348	649	313	272
Illinois	1,969	2,337	3,528	1,545	992
Indiana	1,577	1,338	1,200	1,285	1,398
Iowa	2,175	2,148	1,337	703	627
Kansas	945	4,012	1,281	1,039	365
Kentucky	3,784	4,777	3,680	4,332	3,477
Louisiana	1,826	1,144	1,446	807	1,619
Maine	1,000	166	78	—	—
Maryland	2,572	—	708	660	—
Massachusetts	—	—	—	—	—
Michigan	1,278	1,771	831	2,130	971
Minnesota	4,160	2,593	3,366	3,262	1,475
Mississippi	3,323	5,615	3,464	2,605	1,520
Misouri	3,377	3,370	4,350	1,963	749
Montana	1,607	1,449	1,053	1,146	306
Nebraska	1,509	5,149	1,961	1,786	1,472
Nevada	—	—	—	—	—
New Hampshire	—	—	296	—	—
New Jersey	—	180	—	165	—
New Mexico	9,789	1,723	1,524	8,569	1,009
New York	253	250	7	—	—
North Carolina	6,159	5,629	3,964	3,164	2,126
North Dakota	1,619	2,355	1,747	1,948	860
Ohio	2,476	4,200	2,993	2,685	731
Oklahoma	4,610	2,455	3,215	2,255	2,041
Oregon	814	1,993	1,200	449	270
Pennsylvania	1,739	957	2,090	873	2,066
Rhode Island	—	—	—	—	—
South Carolina	2,344	2,483	1,719	1,974	1,806
South Dakota	2,512	1,603	711	1,265	231
Tennessee	5,272	4,094	5,694	3,902	3,481
Texas	14,243	16,128	4,785	8,901	5,422
Utah	697	31	31	2,066	—
Vermont	77	113	—	134	—
Virginia	2,920	1,076	1,933	1,905	1,806
Washington	1,498	3,215	1,947	2,910	563
West Virginia	—	—	—	—	—
Wisconsin	1,615	1,574	779	1,516	202
Wyoming	2,339	1,752	1,087	1,513	320
Alaska	1,867	686	1,724	510	—

[1] Construction needs of the electric distribution borrowers beyond 1961 were not obtained. Some of the applications to be submitted to cover construction in 1962 and succeeding years may be submitted in 1959, 1960 and 1961. Therefore, the application amounts reported in this table for 1959, 1960 and 1961 are lower by indeterminate amounts than the applications which actually will be submitted.

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Loans Approved February 16, 1956 Through March 16, 1956

Electrification

$	645,000	Shelby Electric Cooperative, Shelbyville, Ill.
	445,000	Ozark Electric Cooperative, Mt. Vernon, Mo.
	138,000	Faribault County Co-op Elec. Ass'n., Frost, Minn.
*	50,000	Todd-Wadena Electric Cooperative, Wadena, Minn.
	120,000	Shenandoah Valley Elec. Co-op, Dayton, Va.
	800,000	Okefenoke REMC, Nahunta, Ga.
	1,110,000	Harney Electric Cooperative, Burns, Oreg.
*	50,000	Caddo Electric Cooperative, Binger, Okla.
	801,000	Farmers Electric Cooperative, Clovis, New Mex.
	585,000	Pea River Electric Cooperative, Ozark, Ala.
	820,000	Clarke-Washington Electric Membership Corp., Jackson, Ala.
	1,050,000	Licking Rural Electrification, Inc., Utica, Ohio
	250,000	South Central Rural Elec. Co-op, Lancaster, Ohio
	200,000	Pocahontas County Rural Elec. Co-op, Pocahontas, Iowa
	250,000	Central Electric Power Assoc., Jefferson City, Mo.
*	50,000	Cape Hatteras EMC, Buxton, N. C.
*	25,000	Craig-Botetourt Electric Co-op, New Castle, Va.
*	50,000	Haywood Elec. Membership Corp., Waynesville, N. C.
	504,000	Grand Valley Rural Power Lines, Inc., Grand Junction, Colo.
	325,000	Nolin Rural Elec. Co-op Corp., Elizabethtown, Ky.
	300,000	Top O'Michigan Rural Elec. Co., Boyne City, Mich.

*—Includes Section 5 funds

Telephone

$	181,000	Cornersville Tel. Co., Cornersville, Tenn.
	145,000	Ottoville Mutual Tel. Co., Ottoville, Ohio
	374,000	Marathon Killawog Tel. Co., Marathon, N. Y.
	71,000	Choteau Telephone Co., Tulsa, Okla.
	42,000	Adams Tel. Co-op, Camp Point, Ill.
	65,000	Parker Valley Tel. Co., Parker, Ariz.
	2,432,000	Western Ark. Tel. Co., Russellville, Ark.
	549,000	Echo Telephone Co., Shepherdsville, Ky.
	172,000	Sully Buttes Tel. Co-op, Highmore, S. Dak.
	381,000	Homerville Tel. Co., Homerville, Ga.
	150,000	Hartland and St. Albans Tel. Co., Hartland, Maine
	45,000	Arab Telephone Co., Arab, Ala.
	308,000	Clifton Telephone Co., Clifton, Texas
	435,000	Skagit Valley Tel. Co., Mt. Vernon, Wash.
	476,000	United Tel. Mutual Aid Corp., Langdon, N. Dak.
	146,000	Fossil Tel. Exchange Fossil, Oreg.
	221,000	Elmore City Tel. Co., Elmore City, Okla.